

BAB V

PERENCANAAN BALOK B3

5.1 Direncanakan Balok WF 350 x 175 x 7 x 11

$W_k := 49.6 \text{ kg/m}$	$A_k := 63.14 \text{ cm}^2$	$Z_x := 841 \text{ cm}^3$
$h := 350 \text{ mm}$	$i_x := 14.7 \text{ cm}$	$Z_y := 172 \text{ cm}^3$
$b := 175 \text{ mm}$	$i_y := 3.95 \text{ cm}$	$G := 80000 \text{ Mpa}$
$t_f := 11 \text{ mm}$	$I_x := 13600 \text{ cm}^4$	$E := 200000 \text{ Mpa}$
$t_w := 7 \text{ mm}$	$I_y := 984 \text{ cm}^4$	
	$L_b := 100 \text{ cm}$	

Mutu Baja BJ 37 :

$$f_y := 240 \text{ Mpa}$$

$$f_u := 370 \text{ Mpa}$$

- Kontrol Kuat Geser

$$\frac{h}{t_w} = 50$$

$$\frac{1100}{\sqrt{f_y}} = 71$$

$$\text{karena } \frac{h}{t_w} < \frac{1100}{\sqrt{f_y}} \text{ (penampang plastis)}$$

$$V_n := 0.6 \cdot 10 \cdot f_y \cdot \left(\frac{h \cdot t_w}{100} \right) = 35280 \text{ kg}$$

$$\phi V_n := 0.9 \cdot V_n = 31752 \text{ kg}$$

Dari hasil perhitungan SAP didapatkan nilai, $V_u := 10389.82 \text{ kg}$ $\blacksquare < \blacksquare \phi V_n = 31752 \text{ kg}$

- Kontrol Kuat Momen Lentur

- Local Buckling

SAYAP

$$\frac{b}{2 \cdot t_f} = 7.95$$

$$\frac{170}{\sqrt{f_y}} = 10.97$$

BADAN

$$\frac{h}{t_w} = 50$$

$$\frac{1680}{\sqrt{f_y}} = 108.44$$

Penampang kompak sehingga $M_n = M_p := Z_x \cdot 2400 = 2018400 \text{ kgcm}$

- Lateral Buckling

$L_b := 100 \text{ cm}$ (pasang balok pengaku $t = 8 \text{ mm}$ jarak 100 cm)

Dari Tabel Ir. Marwan Ibrahim perhitungan panjang L_p dan L_r untuk profil balok didapatkan :

BJ 37 didapatkan nilai $L_p := 200.687 \text{ cm}$

$L_r := 592.505 \text{ cm}$

$L_b < L_p < L_r$ sehingga balok termasuk bentang pendek

Dari hasil perhitungan SAP didapatkan nilai

$M_n := M_p = 2018400 \text{ kgcm}$

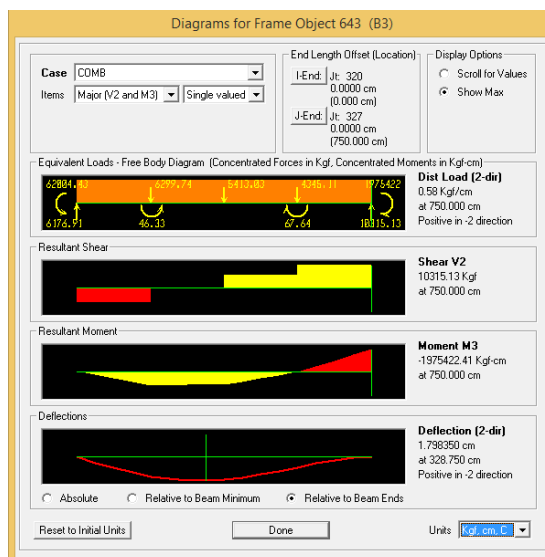
$$\phi M_n := \frac{0.9 \cdot M_p}{100} = 18165.6 \text{ kgm} \quad \blacksquare > \blacksquare \quad \mu := 17754.22 \text{ kgm (Output SAP 2000)}$$

4.2 Kontrol lendutan

$L := 700 \text{ cm}$

$$\text{lendutan izin } f_{ijin} := \frac{L}{360} = 1.94 \text{ cm}$$

Lendutan akibat beban envelope hasil SAP



$\Delta := 1.798 \text{ cm} \quad \blacksquare < \blacksquare \quad f_{ijin} = 1.94 \text{ cm} \quad \text{OK..!}$